

REMARKS

This application has been reviewed in light of the Final Rejection mailed October 5, 2010. Reconsideration of this application in view of the below remarks is respectfully requested. Claims 1 – 6, 9 – 17, 19 – 30, 32, 37 – 39 and 46 are pending in the application with Claims 1 and 32 being in independent form. By the present amendment, Claims 1, 6, 9, 10, 13, 15 – 17, 19, 21 – 23, 26, 32, 37, 39 and 46 are amended. Specifically, Claims 9, 37 and 39 have been amended to address indefiniteness rejections, while the remaining amended claims have been amended to address informalities. Therefore, no new subject matter is introduced into the disclosure by way of the present amendments.

The Office Action of October 5, 2010 has been carefully considered. It is respectfully submitted that all issues raised are traversed, being hereafter addressed with reference to the relevant headings appearing in the Detailed Action section of the Office Action.

I. Rejection of Claims 9 and 39 Under 35 U.S.C. § 112, Second Paragraph

The Office Action has rejected Claims 9 and 39 under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

Regarding Claim 9, the phrase: "...sufficiently smooth so that the solution trajectories do not adversely affect the subject..." recited in Claim 9 is allegedly unclear, because the Office Action contends that one would not know what attribute of a subject would be adversely affected by the solution trajectories.

In response, Claim 9 has been amended to clarify the relationship between the solution trajectories and the subject when the solution trajectories are sufficiently smooth, by

reciting in relevant part that “...the solution trajectories represent progressions of the condition that do not adversely affect the subject.”

Regarding Claim 39, the Office Action contends that the phrase “the method of attempting to determine the complete values” lacks antecedent basis.

Claim 39 has been amended to recite the language used in Claim 37 (which has itself been revised to replace “...attempting to calculate a complete set of system values...” in part c with “...calculating a complete set of system values...”). Specifically, Claim 39 now recites “...wherein calculating the complete set of system values comprises...” which has an antecedent basis in Claim 37.

The Applicant respectfully submits that the claims as amended now particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Accordingly, Applicant respectfully requests withdrawal of the rejection with respect to Claims 9 and 39 under 35 U.S.C. § 112, second paragraph.

II. Rejection of Claims 1 – 5, 21 – 30, 32, 37, 38 and 39 Under 35 U.S.C. § 103(a)

Claims 1 – 5, 21 – 30, 32, 37, 38 and 39 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over “Extracting Model Equations from Experimental Data” by Friedrich et al. (hereinafter, “Friedrich”) in view of PCT Application No. WO 94/06088 (hereinafter, “Sillen”).

The present invention relates to methods and systems for determining a treatment program for a subject. As discussed in the specification, the techniques are applicable to any subject, or any condition, but are particularly suited to determining medication programs for patients having medical conditions. In general, the techniques of the present invention utilize solution trajectories which represent the progression of the subject's condition, and which are

determined in accordance with a model of the subject's condition and system values representing the condition of the subject.

The solution trajectories utilized in the present invention are described throughout the specification. For example, page 10, lines 6 – 12 recites:

In particular, with the equations effectively modeling the condition of the subject, the solution trajectories generated by solving the equations will represent potential routes of progression of the condition within the individual. Thus, each solution trajectory will effectively model how the condition will potentially develop. (Emphasis added).

Friedrich discloses a method for empirically constructing equations from data generated by a complex system under particular circumstances, and also presents a method for generating and assessing geometrical patterns for the purposes of graphically differentiating measured tremor time series data. Based on the graphical characteristics of the measurements, a technician is able to determine the particular type of tremors, either physiological, essential or Parkinson's disease induced, experienced by the subject. For example, physiological tremors exhibit a unique pinwheel configuration of the phase trajectories within a rather chaotic trajectory distribution, essential tremors exhibit a more orderly trajectory distribution with spiraling configuration. Regarding Parkinson's disease, the trajectories are highly ordered and arranged in circular trajectory configurations. By assessing a specific subject's measured data using phase space graphs in such a way, the cause of the subject's tremors can be determined.

It is noted that the rejection of Claim 1 refers only to disclosure in section 4 of Friedrich “Analysis of tremor time series”, which relate to the above mentioned method for differentiating between physiological tremor as a symptom of Parkinson's disease and other

tremor conditions. FIG. 4 of Friedrich presents graphs of “trajectories” generated by measured tremor data. However, these trajectories in Friedrich are not equivalent to the claimed “solution trajectories”.

The Office Action contends that since no special definition is provided for “solution trajectories”, the trajectories disclosed in Friedrich cannot be distinguished. However, the specification as originally filed does provide a definition for the recited “solution trajectories” on page 10, lines 6 – 12, as mentioned above. Specifically, the solution trajectories represent “...potential routes of progression of the condition within the individual...”

Therefore, a suitably skilled person would appreciate that the use of the term “solution trajectories” does indeed distinguish from the historical measurements of the type shown by Friedrich. In this regard, Applicant submits that the terms of the claims should be interpreted with respect to the specification. As held by the Federal Circuit in Philips v AWH Corp. (*Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005):

The Patent and Trademark Office (“PTO”) determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction “in light of the specification as it would be interpreted by one of ordinary skill in the art.” In re Am. Acad. of Sci. Tech. Ctr., 367 F.3d 1359, 1364[, 70 USPQ2d 1827] (Fed. Cir. 2004). Indeed, the rules of the PTO require that application claims must “conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.” 37 C.R.R. 1.75(d)(1). (Emphasis added).

Thus, it is evident that the “solution trajectories” recited in the claims are distinct from the “trajectories” disclosed in Friedrich. Friedrich's “trajectories” are indicators of measured physical states of a subject, and provide no information representing “potential routes of progression of the condition within the individual”.

In addition to this, independent Claim 1 requires “...solution trajectories representing the progression of the condition in accordance with the model and the determined system values...” However, the trajectories in Friedrich are paths in phase space which represent historical measured states as defined by the tremor time series data. Thus, the time series data are historical measurements of the physical manifestations of symptoms of a condition and are not, therefore, representing the progression of the condition and are not determined in accordance with a model.

In this regard, “the progression of a condition” is not necessarily directly correlated to the symptoms. For instance, as a subject's condition progresses towards an improved condition, the symptoms may in fact become worse for a period of time. Such symptom developments are not, therefore, necessarily representative of an undesirable progression of the condition. Given this, it will be understood that there is not necessarily a correspondence between symptoms of a condition and “the progression of the condition” itself. Hence, Applicant respectfully submits that historical symptoms do not represent “the progression of the condition”, as required by independent Claim 1, and cannot be considered solution trajectories that correspond to potential routes of progression of the condition within the individual.

While it is noted that Friedrich does disclose a method for empirically constructing equations from data generated by a complex system, this aspect of Friedrich's

teachings is restricted to limited circumstances, and the formulation of the equations is “data-driven” as opposed to being based on the underlying dynamics of the system through the collection of data and known properties of the system. This is acknowledged by Friedrich in section 1 “Introduction”, paragraph 1.

Indeed, any equations constructed by Friedrich are for allowing deterministic and stochastic (for example, “noisy”) parts of the dynamics of a system to be separated and quantified from observed data. (See: section 1 “Introduction”). Friedrich's equations merely facilitate this separation of the stochastic and deterministic dynamic parts of the observed time series tremor data and do not actually determine any of the underlying dynamics of the biological system. Accordingly, the equations of Friedrich do not correspond to “a model of the condition” which may subsequently be used to determine “solution trajectories representing the progression of the condition”.

In any event, as there is not necessarily a correspondence between symptoms and conditions, any equations generated from the tremor time series data could only possibly be indicative of the tremor symptom, and cannot be considered to represent “a model of the condition” as required by Claim 1.

Moreover, a “model of the condition” as recited in independent Claim 1 is understood to be a representation of the condition as a whole, such that changes made to a set of variables representing, for example, a treatment regimen would cause a change in the progression of the condition. In Friedrich, the disclosed equations have no means of introducing variable changes that would result from the application of a treatment regimen, or even any means to account for relevant system values that may vary between subjects. Thus, Friedrich's equations

are not what would be considered a “model of the condition” by one of ordinary skill in the art, but merely a mathematical description of properties of observed data.

Moreover, Friedrich does not disclose using “...the subject data and a model of the condition to determine system values representing the condition...” Instead, the only data obtained from the subject in Friedrich is the time series data that is taken from a series of measurements using an accelerometer to measure tremors of a subject's hand. However, no mention is made in Friedrich with regards to further analyzing the tremor data and a model of the condition to determine system values representing the condition. Rather, Friedrich plots a graphical representation of a processed form of the time series data, without determining any system values as claimed.

Furthermore, Friedrich is only applicable under particular circumstances. Specifically, the application of Friedrich is restricted to systems where the data is generated by a Langevin equation satisfying a so-called “Markovian condition” (also known in the art as the “Markov property”, and where the systems are in a state of deterministic chaos, as discussed in section 1 “Introduction” of Friedrich).

In particular, the Markovian condition requires that the time development of a system depends only upon the present state and not on its evolution in the past. (See: section 2 “Numerical method”, paragraph 1 of Friedrich). With regards to the state of deterministic chaos, this means that the dynamics of the system are highly sensitive to initial conditions, such that a particular future state of the system cannot easily be predicted.

The stochastic and dynamic parts of time series data can therefore only be separated and quantified as taught by Friedrich in systems that satisfy the above restrictions.

However, these restrictions would tend to render the methods of Friedrich inapplicable to almost all medical conditions.

One reason for this is that the dynamics of almost all medical conditions can be considered to fail the Markovian condition. This is because the time development and biological responses of most medical conditions significantly depend on the past history of the disease within the individual subject and the gradual adaptive response of the host biology to both the disease and past treatments. For example, the subject may acquire a drug tolerance over time. In general, the administration of a treatment would also tend to invalidate the assumption of Markovian condition, and in this regard it is noted that Friedrich makes no mention of medication or its modification.

Thus, by restriction to systems exhibiting Markovian condition, this means that Friedrich's method cannot consider changes in the underlying system dynamics over time. In other words, Friedrich cannot accommodate any progression of the system with time varying parameters and hence cannot determine the progression of the condition. Instead Friedrich's tremor time series merely represent a series of instantaneous tremor states, which represent isolated “snapshots” of the symptom. Although Friedrich performs analysis of the time series data, this is to determine an absolute tremor state from these snapshots, and not a “progression” which may include changes to the underlying system dynamics.

In support of the above analysis, the rejection concedes that Friedrich does not disclose or suggest “determining a treatment program in accordance with the determined solution trajectories”. Instead, Sillen is alleged to provide disclosure of this feature.

However, Sillen does not provide any disclosure or suggestion for “determining a treatment program in accordance with the determined solution trajectories”. Sillen merely

controls the administration of medications based on rules established on the basis of detected relationships between the intake of medicine by, and the state of health of, the patient using inductive data analysis. Moreover, Sillen fails to overcome the deficiencies indentified above with respect to Friedrich.

In fact, Sillen explicitly abandons attempting any kind of analytical modeling and dynamic control of a medical condition, in favor of a purely numerical rules-based expert system. For example, Sillen rejects the idea of attempting a detailed modeling of drug-disease interactions (such as the drug pharmacokinetics), asserting that circumstances of partial information and complexity of such modeling make this too difficult to be practicable. (See: page 1, line 30 to page 2, line 6 of Sillen). Consequently, Sillen abandons explicit modeling of drug-disease interactions of the search for explicit values of patient parameters or variables, in favor of an empirical approach, thus teaching away from “determining a treatment program in accordance with the determined solution trajectories”. (See: page 3, lines 16 – 25 of Sillen).

While the approach of Sillen is not fixed, but capable of gradually “learning” what is needed for the well-being of a patient, Sillen provides no teaching of performing any mathematical modeling of the patient's condition or treatment, formulating equations that could allow determination of “one or more solution trajectories representing the progression of the condition in accordance with the model and the determined system values” or “determining a treatment program in accordance with the determined solution trajectories”. Instead, Sillen describes using an expert system which uses inductive data analysis and rule generation to make predictions. (See: page 5, lines 11-22 of Sillen).

Accordingly, it is respectfully submitted that the technique in Sillen is based upon a completely different concept when compared to both Friedrich's method and the present

invention. Consequently, any treatment determination methodology taught by Sillen could not be readily adapted to operate with mathematical solution trajectories based on a model of the subject's condition, thus Sillen and Friedrich cannot be operatively combined by one of ordinary skill in the art. Moreover, Sillen cannot be considered to teach “determining a treatment program in accordance with the determined solution trajectories”, as required in independent Claim 1, irrespective of whether “solution trajectories” are actually taught by Friedrich.

The Office Action has asserted (point 53) that Sillen utilizes an algorithm to formulate a treatment regimen based upon past data to predict future outcomes, and that this is equivalent to the claimed “trajectory” where the condition is a “state of health”. However, in making this assertion, the Office Action has not appreciated the meaning of the claimed “solution trajectory” as it would be understood by a skilled person in the context of the present invention, as described in the specification. An algorithm is merely a set of ordered steps and the use of an algorithm to make a prediction does not provide the same information or fidelity as a “solution trajectory representing the progression of a condition in accordance with a model”. Accordingly, the assertion regarding Sillen teaching a solution trajectory is incorrect.

In addition, “state of health” in Sillen is defined by a subjective sense of well-being experienced by the patient. Sillen explicitly rejects the notion that this “state of health” is describable analytically, such as in a state space representation. Instead, Sillen declares that for many diseases “there does not exist any single actual value or condition of the patient that can be correlated with the well-being of the patient”. Consequently, the “state of health” described by Sillen is not related to, or compatible with, “solution trajectories” in the manner asserted by in Office Action. Therefore, Sillen cannot be considered to teach “determining a treatment program

in accordance with the determined solution trajectories” when considered in the overall context of independent Claim 1.

Furthermore, given that Sillen explicitly rejects the use of analytical models, there is no way that Sillen could remedy the other deficiencies of Friedrich. Given the above discussed limitations, Sillen's methods are inherently unable to deal with potential future progressions of the condition within the individual, and thus cannot be considered to disclose “solution trajectories” as claimed, or the particular use of those “solution trajectories” in the determination of the treatment program. Accordingly, Applicant submits that any combination of Friedrich and Sillen fails to disclose each of the above discussed claimed features.

Aside from the failures of Friedrich and Sillen to disclose the claimed features, Applicant also respectfully submits that the alleged combination of those two references are not within the capability of a person having ordinary skill in the art, in any event.

A person having ordinary skill in the art would simply be incapable of combining the dynamical data analysis techniques taught by Friedrich with the rule-based methods of providing medication advice as taught by Sillen, not least because Sillen explicitly rejects any analytical approach.

In particular, the combination of Friedrich and Sillen asserted in the Office Action does not take into consideration the inherent constraints within each prior art reference, and the mutually inconsistent structures and assumptions of the mathematics utilized therein. A careful reading of Friedrich and Sillen reveals essential mathematical incompatibilities among their proposed architectures and underlying assumptions which would prevent their combination to provide an internally consistent mathematical architecture as per the present invention.

In other words, irrespective of the above discussed deficiencies of Friedrich, a skilled person could not merely modify the modeling method of Friedrich to provide trajectories to a medication method as taught by Sillen to obtain meaningful results, because the respective teachings of Friedrich and Sillen are fundamentally incompatible.

In fact, the formulation of Sillen is such that it is incapable of processing information represented by one or more solution trajectories representing future progressions of the condition, even if such information were input externally using methods beyond those disclosed by the cited prior art. Sillen's method would not recognize the input as solution trajectories, because it relies upon a numerical expert system using decision trees constructed entirely around past subject history, and has no capacity to process potential progressions of the condition as represented by solution trajectories.

The method disclosed by Sillen is only capable of evaluating past and present events. Any predictions generated by Sillen are based on rules and do not involve the extrapolation of a model, nor do they involve a "solution trajectory". Attempting to extend the teachings of Sillen to include evaluation of potential events as input data would be beyond the disclosed scope of Sillen, and would corrupt the integrity of the process of inductive rule generation from reliable observed data, that Sillen relies upon. Given that a modification of a prior art reference for the purpose of a prior art rejection cannot change the principle of operation of the reference, it is respectfully submitted that the alleged combination is invalid.

Even if the teachings of Friedrich and Sillen could be combined, which Applicant does not concede, the alleged combination of Friedrich and Sillen might merely provide a methodology for using measured data, i.e. measured tremor time series data, to determine a probable cause of the tremors by comparison against graphical phase space representations of

three known tremor types. Once the probable cause is determined, a particular medication or other treatment is administered and adjusted as needed based on the tremors suffered by the subject after medication. However, no modeling of the condition itself is disclosed or suggested by the combination. Moreover, the combination fails to disclose or suggest generating “solution trajectories” that represent potential routes of progression of the condition within the individual.

Instead the combined teachings of Friedrich and Sillen provide only indications of the present condition of a subject which could be compared with previous such indications to progress of treatment and the underlying condition to date, not a forward looking prediction of the progression of the condition.

As discussed above, Friedrich and Sillen collectively would fail to teach, or otherwise render obvious, all of the essential features of the invention as recited in independent Claim 1. Accordingly, independent Claim 1 defines subject matter that is novel and non-obvious in view of the cited prior art.

Independent Claim 32 is directed to an apparatus having similar features as independent Claim 1. Consequently, independent Claim 32 is also novel and non-obvious for the same reasons as provided above with respect to Claim 1.

It is also noted that the Office Action identified “Treatment Strategies for the Management of Chronic Illness: Is Specialization Always Better?” by Veazie et al. (hereinafter, “Veazie”) as disclosing an apparatus of independent Claim 32, but the Office Action only referred to disclosures of Friedrich and Sillen in the detailed comments of the rejection of Claim 32, similar to those referenced in the rejection of Claim 1. Accordingly, Applicant assumes that the identification of Veazie in this regard was due to a typographical error, and thus the

relevance of Veazie has not been considered with respect to independent Claim 32. In any event, the disclosure in Veazie fails to remedy the above discussed deficiencies of Friedrich and Sillen.

With regard to Claims 2 – 5, 21 – 30 and 37 – 39, each of these claims is also novel and non-obvious given their dependencies from the independent claims. Nevertheless, further distinctions are defined in the dependent claims, and examples of these are outlined below.

Regarding the features recited in Claim 3, neither Friedrich nor Sillen disclose or suggest system values including state variable values representing rapidly changing attributes and parameter values representing slowly changing or constant attributes. As discussed above with regards to independent Claim 1, neither Friedrich nor Sillen actually determine system values representing the condition by analyzing subject data and a model of the condition. The Office Action has asserted that the accelerometer measurements are rapidly changing attributes, but the accelerometer measurements could only be considered equivalent to subject data since they are obtained directly from the subject, and not determined using a model. The Office Action has also asserted that time is a constant attribute, and hence a parameter value, but this is incorrect, since if time were constant, there would be no time series or trajectory. Therefore, Claim 3 is believed to be allowable for at least the reasons present here as well as in view of Claim 3 being dependent on independent Claim 1.

Regarding the features recited in Claim 4, neither Friedrich nor Sillen disclose or suggest “determining control variable values, where the control variables represent attributes of the condition that can be externally controlled”. Instead, Friedrich discloses a d-dimensional stochastic vector having a deterministic part and a stochastic part, with the stochastic part including terms representing white noise. However, no mention is made that the terms

representing white noise in the stochastic part are at all externally controlled. Rather, the white noise is inherent to the system itself. (See: last paragraph of Section 1 “Introduction” of Friedrich).

Furthermore, the Office Action has stated that “control variable values are not utilized by the method other than being determined (i.e. they do not affect the treatment of the patient)”. However, it appears that the Office Action has not interpreted “control variable” in the context of the invention. Claim 4 clarifies the meaning of “control variables” by requiring that they “represent attributes of the condition that can be externally controlled”. Accordingly, the contextual meaning of the term would be readily apparent to the skilled person. It is clear that the control variables as recited in Claim 4 can indeed affect the treatment of the patient. Since the cited references do not disclose or suggest control variables as claimed, Claim 4 is also believed to be allowable over the cited references for at least the reasons present here as well as in view of Claim 4 being dependent on independent Claim 1.

With regard to Claim 5, the arguments presented above regarding the non-disclosure of a model of the condition also apply to the feature of model equations representing the condition, which similarly are not shown by either Friedrich or Sillen.

Therefore, for at least the reasons presented above, Claims 1 – 5, 21 – 30, 32, 37, 38 and 39 are believed to be allowable over the cited prior art references. Accordingly, Applicant respectfully requests withdrawal of the rejection with respect to Claims 1 – 5, 21 – 30, 32, 37, 38 and 39 under 35 U.S.C. § 103(a) over Friedrich in view of Sillen.

III. Rejection of Claims 6, 9 – 11 and 15 Under 35 U.S.C. § 103(a)

Claims 6, 9 – 11 and 15 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Friedrich in view of Sillen and further in view of “Control of a Chaotic System” by Vincent et al. (hereinafter, “Vincent”).

Initially, Vincent fails to overcome the deficiencies identified above with respect to Friedrich and Sillen. Specifically, Vincent, taken alone or in any proper combination with Friedrich and Sillen, fails to disclose or suggest “...using the subject data and a model of the condition to determine system values representing the condition; determining one or more solution trajectories representing the progression of the condition in accordance with the model and the determined system values; and determining a treatment program in accordance with the determined trajectory” as recited in Claim 1 from which Claims 6, 9 – 11 and 15 depend.

With respect to Claims 6 and 9, Vincent does not express any opinion regarding desirability of a behavior in general, nor the specific criteria recited in Claims 6 and 9. Rather, the system modeled by the Lorenz equations in Vincent describes the Ehrhard and Muller “natural convection in a closed-loop” experiment. The described system is, by its very nature, chaotic, and thus, while the system may be provided with parameter values that will result in stability about one or more equilibrium points, the system will not become non-chaotic. Moreover, Vincent fails to disclose identifying acceptable solution trajectories based on the solution trajectories being “...sufficiently smooth so that the solution trajectories represent progressions of the condition that do not adversely affect the subject...” These criteria, recited in Claims 6 and 9, are not disclosed or suggested in either Friedrich or Sillen, alone or in any combination with Vincent.

Therefore, for at least the reasons presented, Claims 6, 9 – 11 and 15 are believed to be allowable over cited prior art references. Accordingly, Applicant respectfully requests withdrawal of the rejection with respect to Claims 6, 9 – 11 and 15 under 35 U.S.C. § 103(a) over Friedrich in view of Sillen and further in view of Vincent.

IV. Rejection of Claims 16 and 17 Under 35 U.S.C. § 103(a)

Claims 16 – 17 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Friedrich in view of Sillen and Vincent and further in view of “Treatment Strategies for the Management of Chronic Illness: Is Specialization Always Better?” by Veazie et al. (hereinafter, “Veazie”).

Veazie, taken alone or in any proper combination with Friedrich, Sillen and Vincent, fails to overcome the deficiencies identified above with respect to Claim 1, from which Claims 16 – 17 depend.

Therefore, for at least the reasons presented, Claims 16 – 17 are believed to be allowable over cited prior art references. Accordingly, Applicant respectfully requests withdrawal of the rejection with respect to Claims 16 – 17 under 35 U.S.C. § 103(a) over Friedrich in view of Sillen and further in view of Veazie.

V. Rejection of Claims 12 – 14 Under 35 U.S.C. § 103(a)

Claims 12 – 14 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Friedrich in view of Sillen, and further in view of “Liapunov Functions: Geometry and Stability” by Tuljapurkar et al. (hereinafter, “Tuljapurkar”).

Tuljapurkar, taken alone or in any proper combination with Friedrich and Sillen, fails to overcome the deficiencies identified above with respect to Claim 1, from which Claims 12 – 14 depend.

Therefore, for at least the reasons presented, Claims 12 – 14 are believed to be allowable over cited prior art references. Accordingly, Applicant respectfully requests withdrawal of the rejection with respect to Claims 12 – 14 under 35 U.S.C. § 103(a) over Friedrich in view of Sillen and further in view of Tuljapurkar.

VI. Rejection of Claims 19 and 20 Under 35 U.S.C. § 103(a)

Claims 19 and 20 are rejected under 35 U.S.C. § 103(a) as allegedly obvious over Friedrich in view of Sillen and Vincent, and further in view of Tuljapurkar.

Tuljapurkar, taken alone or in any proper combination with Friedrich, Sillen and Vincent, fails to overcome the deficiencies identified above with respect to Claim 1, from which Claims 19 and 20 depend.

Solution trajectories are not disclosed at all in Tuljapurkar. Consequently, Tuljapurkar does not define a second Liapunov function for which the gradient defines modified solution trajectories moving towards the undesired points; and determines Nature values that result in modified solution trajectories travelling down the gradient of the second Liapunov function in accordance with the constraints, as recited in Claim 19.

Moreover, none of the references disclose or suggest determining the treatment program in accordance with control programs and the Nature programs by: “determining starting points having modified solution trajectories for which control programs exist”; and “determining starting points having modified solution trajectories for which nature programs exist”, as recited in Claim 20.

Therefore, for at least the reasons presented, Claims 19 and 20 are believed to be allowable over cited prior art references. Accordingly, Applicant respectfully requests withdrawal

of the rejection with respect to Claims 19 and 20 under 35 U.S.C. § 103(a) over Friedrich in view of Sillen and Vincent and further in view of Tuljapurkar.

VII. Rejection of Claim 46 Under 35 U.S.C. § 103(a)

Claim 46 is rejected under 35 U.S.C. § 103(a) as allegedly obvious over Friedrich in view of Sillen and further in view of Veazie.

Veazie, taken alone or in any proper combination with Friedrich and Sillen, fails to overcome the deficiencies identified above with respect to Claim 1, from which Claim 46 depends.

Therefore, for at least the reasons presented, Claim 46 is believed to be allowable over cited prior art references. Accordingly, Applicant respectfully requests withdrawal of the rejection with respect to Claim 46 under 35 U.S.C. § 103(a) over Friedrich in view of Sillen and further in view of Veazie.

CONCLUSIONS

In view of the foregoing amendments and remarks, it is respectfully submitted that all claims presently pending in the application, namely, Claims 1 – 6, 9 – 17, 19 – 30, 32, 37 – 39 and 46 are believed to be in condition for allowance and patentably distinguishable over the art of record.

If the Examiner should have any questions concerning this communication or feels that an interview would be helpful, the Examiner is requested to call Applicant's undersigned attorney at the number indicated below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "F. S. DiGiglio", with a stylized flourish at the end.

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